all to the federal courts.[10] The Act provides three remedies: dissolution or a criminal prosecution by the government, a forfeiture of property, and an action for threefold damages by any person injured.[11] The last does appear inconsistent with an intention to vest the exclusive right to deal with violations of the Act in the government. Yet here, too, jurisdiction is vested solely in the federal courts;[12] and although one conclusive determination as to the legality of a combination for all purposes is not provided for, at least neither state nor federal courts are affirmatively given jurisdiction to attack monopolies collaterally by refusing to enforce contracts furthering their purposes. The contention that the Act goes further and deprives the courts of the right of such collateral attack is powerfully supported by an analogy in the interpretation of the Act to Regulate Commerce.[13] This, likewise, gives any person the right to sue for damages in any district or circuit court.[14] And it further provides that all existing remedies are preserved, the provisions of the Act being "in addition to such remedies." [15] Yet, in order to prevent interference with what the Supreme Court considered a fundamental policy of the Act, namely, the maintenance of a uniform standard of rates, it construed the Act as depriving courts of their undoubted former jurisdiction to pass upon the reasonableness of rates, unless and until they had been found unreasonable by the Interstate Commerce Commission.[16] Such an interpretation of the Sherman Law, which also has no express provision on the matter, may seem strained.[17] But by means of it the courts are deprived of their otherwise undoubted right to refuse enforcement to contracts furthering illegal monopolies, and the desirable result of the principal case attained.[18]

EVIDENTIAL USE OF MATHEMATICALLY DETERMINED PROBABILITY. — A recent case in New York instancing methods of criminal detection reminiscent of Sherlock Holmes [1] also exhibits what is apparently a new problem in the law of expert evidence. *People* v. *Risley*, 214 N. Y. 75,

[10] See the majority opinion when the principal case was before the Georgia Court of Appeals. Wilder Manufacturing Co. *v.* Corn Products Refining Co., 11 Ga. App. 588, 599, 75 S. E. 918, 923.

[11] 26 U. S. STAT. AT LARGE, 209, §§ 4, 6, 7.

[12] The recent amendment that the result of a government suit will be *primâ facie* evidence in a suit by a private party is also significant. TRADE COMMISSION ACT of Oct. 15, 1914, § 5.

[13] 24 U. S. STAT. AT LARGE, 379.

[14] *Ibid.* § 9.

[15] *Ibid.* § 22.

[16] Texas & Pac. Ry. *v.* Abilene Cotton Oil Co., 204 U. S. 426.

[17] To be sure, in developing common-law principles the courts go slowly in order to avoid judicial legislation. See Holmes, J., in Stack *v.* New York, N. H. & H. R. Co., 177 Mass. 155, 158. But in applying a statute the courts may properly take stronger action in order to carry out the legislative intent. See Lord Haldane in Trim District School Board *v.* Kelley [1914] A. C. 667, 680. *Cf.* 28 HARV. L. REV. 308, n. 12.

[18] A logical application of the analogy would seem also to subject the individual's right to sue for threefold damages to the condition precedent of an adjudication of the illegality of the monopoly in a direct attack by the Attorney-General.

[1] "A Case of Identity," by Sir Arthur Conan Doyle.

108 N. E. 200.[2] To show that a typewritten forgery had been done on the defendant's typewriter, experts on typewriters were called, who testified that certain peculiarities of the form and alignment of the type exhibited by the specimen in question corresponded exactly with peculiarities exhibited by writing from defendant's typewriter.[3] An expert mathematician was next produced, who, in response to a hypothetical question ascribing certain ratios to the probable recurrence of any one defect, was allowed to testify that the probability of the coincidence of all these defects in another machine was one in four billion.[4] The admission of the latter testimony was held to be reversible error on the narrow and doubtless unimpeachable ground that the assumed hypothesis was unwarranted by any evidence in the case, but the court indicated that such testimony is necessarily improper to establish a past event.[5]

An obvious, though unsound, objection to the admission of such evidence is that it is an opinion by a witness no more expert in the sort of phenomena under investigation — *viz.*, typewriters — than the jury; or, as it is sometimes said, that it amounts to an usurpation of the jury's function.[6] Undoubtedly it is the function of the jury to pass judgment on the facts and determine the weight of inferences to be drawn. Reasoning by witnesses is not allowed unless it is of a sort which the jury is not equally well qualified to do for itself. But it is fundamental that one possessing special skill or knowledge, not open to all, concerning the sort of phenomena under investigation, and whose opinion will therefore be of assistance, will be permitted to express an opinion as to the probability of an occurrence;[7] and it seems equally in accord with the spirit of the opinion rule to allow the same sort of testimony by one who, although without special knowledge of facts, is skilled in a specialized method of treating facts, provided his method is of value in judicial investigation.[8]

The only objection, if any, to the admission of expert evidence must therefore be that mathematically determined probability is of no use in judicial investigation. The probability of an event is not a quality of the event itself, but expresses a degree of uncertainty in our knowledge

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[2] A statement of the case will be found in RECENT CASES, p. 708.

[3] An instance of similar use of such evidence is found in State *v.* Freshwater, 30 Utah 442, 85 Pac. 447. See also Levy *v.* Rust, 49 Atl. 1017 (N. J.).

[4] Similar testimony as to the chance of a given individual writing three signatures exactly alike was admitted in the celebrated Howland Will Case, an account of which will be found in 4 AM. L. REV. 625. The appeal was decided on other grounds and the correctness of this ruling not tested. See Robinson *v.* Mandell, 3 Cliff. (U. S.) 169.

[5] Hogan, J.: "That rule [referring to expectancy tables] is used from necessity when the fact to be proved is the probability of the happening of a *future* event. It would not be allowed, for illustration, if the fact to be established were whether A had in fact died, to prove by the Carlisle table he should still be alive." 214 N. Y. 75, 86, 108 N. E. 200, 203.

Seabury, J. (dissenting on other grounds): ". . . I should hesitate to cast a vote which . . . would sanction the reception of such evidence as to past transactions." 214 N. Y. 75, 96, 108 N. E. 200, 206.

[6] For a criticism of this phrase see 3 WIGMORE, EVIDENCE, § 1920.

[7] See 3 WIGMORE, EVIDENCE, § 1976.

[8] See 3 WIGMORE, EVIDENCE, § 1923, where it is said: "But the only true criterion is: On *this subject* can a jury from *this person* receive appreciable help."

concerning it.[9] All events are certain in nature. Probability is thus an expression of the effect of more or less evidence in giving rise to belief. The use of the term in mathematical science is not different from its use in the affairs of everyday life, except that in everyday life probability takes into account evidence of all kinds, whereas mathematical probability can deal only with the convincing effect of a very limited kind of evidence. Probability is determined mathematically by taking the ratio of the number of possible cases in which given circumstances may combine to produce a given event, to the total number of possible cases in which the circumstances may conceivably combine in all ways, when nothing induces a belief that any particular case will occur rather than another.[10] The ratio is thus a shorthand expression of the truth concerning a large series of events. The only truth expressed finally is as to the series as a whole,[11] without taking into account any special evidence as to any particular individual of the series.[12] Nevertheless, having evidence only as to the whole, with none as to particulars, the mathematical calculation affords the most accurate and rational method of measuring the proper effect of this evidence upon belief.

This proposition receives recognition in the law when it becomes necessary in estimating the amount of a recovery, the right to which is shown by more satisfactory evidence,[13] to determine the future date at which an individual will die (or would have died but for the conduct of defendant). Here the facts of experience consist of statistics showing the ages to which a large number of individuals of the given age have been observed to live. Mathematics is applied to these statistics to give the probable expectancy, which is almost everywhere admitted as evidence.[14] Now, as pointed out by a learned writer, it is not the futurity of an event which induces us to act upon such evidence, but the absence

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[9] See MILL, SYSTEM OF LOGIC, 3 ed., Bk. 3, ch. 18, § 1.

[10] *Cf.* the definition by La Place in 22 Encyclopædia Britannica, 11 ed., tit. Probability, p. 377.

[11] The conception of mathematical theory of probability as dealing with a series of events rather than with particular individuals of a series is developed in VENN, THE LOGIC OF CHANCE, ch. 1, §§ 1–9.

[12] This accounts for the seeming paradox that many events which are determined by mathematics to be improbable (on the whole) are easily believed to have happened. Any evidence to prove that a particular individual belongs to a class occurring very infrequently in the series in no way contradicts a calculation which did not consider the particular evidence, and conversely the particular evidence is not weakened because of the calculation. Indeed, the only reason for making a calculation based on general data is the absence of more satisfactory data relative to the particular event. So when a mathematically improbable event is asserted to have happened, the entire basis of probability is shifted. The question becomes one of the probability of the individual's veracity and of the probable trustworthiness of his sources of information; or if an eyewitness, of the probable accuracy of his observation.

[13] It will be noted that the evidence required to induce a court to give any judgment at all must show stronger probability than that required to fix the amount of such a judgment, once it is shown that a judgment should be given. This difference obviously rests solely on practical necessity. It is submitted that this fact is responsible for the apparent force of the example given by Hogan, J., in support of his argument (*supra*, n. 5). But it does not follow that evidence susceptible of mathematical treatment could never have sufficient weight to prove an issue requisite to recovery. *A fortiori* it does not follow that expert mathematical calculation upon such evidence should always have such small relevancy as to be inadmissible on such an issue.

[14] See 3 WIGMORE, EVIDENCE, § 1698.

of other evidence of more convincing nature [15] — a situation obviously more often, but not necessarily only, existing with regard to future events. Hence it is submitted that, given relevant evidence to which mathematical calculation is applicable, it should be equally admissible whether the *probandum* concerns the past or future.[16] There may, of course, be cases where the evidentiary facts to be used as basis of calculation will have such slight relevancy that it will be useless to use them, and of course their mathematical expression will be equally excluded. There may also be cases in which general data, standing alone, indicate a strong probability, but in which there is sufficient evidence relative to the particular event in question to make the mathematical probability based only on general knowledge have almost no value. Here the calculation would be superfluous also, although the general data might be relevant to assist in a proper understanding of the more specific evidence under consideration. But these are questions of auxiliary policy dependent upon the facts of particular cases, and it is submitted that no general rule should exclude the mathematical calculation of probability in any case where the facts are susceptible of such treatment.

ENFORCEMENT OF TRADE — UNION RULES TO PUNISH AN OUTSIDE PARTY. — Frequent discussions have left the field of labor litigation bereft of virgin charm. A Rhode Island case, however, is worthy of note because of its liberal view. *Rhodes Bros. Co.* v. *Musicians' Protective Union Local, etc.*, 92 Atl. 641.[1] The court in that case dissolved an injunction which had issued against a musicians' union restraining it from imposing fines on any of its members to prevent them from playing for the plaintiff. The musicians had been ordered not to enter the plaintiff's employment under a by-law of the association which prohibited any member from playing for any person who the directors might decide had broken a contract with one of the union.

When a combination resorts to conscription of neutrals, complicated questions arise beyond the scope of the present discussion, but the right of a trade union to require its own members to comply with its own rules seems simply a consequence of recognizing such unions as lawful associations. Some courts, however, while not questioning the right to inflict the drastic penalty of expulsion, have held that an outside party is illegally injured when fines or threat of fines are used to promote united action against him.[2] This seems a decidedly strange result, for as in these jurisdictions the fines are uncollectable, a member could readily avoid

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[15] VENN, THE LOGIC OF CHANCE, ch. 5, § 5.

[16] To draw an example similar to that given by the court. Suppose, in a case where the presumption of death does not apply, it is desired to prove the death of an individual who has disappeared. The fact that if alive he would now have reached the age of ninety-five would certainly be relevant. Would it not also be permissible to show the proportionate number of persons who, reaching the age of the given individual when last heard from, also reach the age of ninety-five?

[1] For a more complete statement of this case see RECENT CASES, p. 718.

[2] L. D. Willcutt & Sons *v.* Driscoll, 200 Mass. 110, 85 N. E. 897; Martell *v.* White, 185 Mass. 255, 69 N. E. 1085 (traders' association); Boutwell *v.* Marr, 71 Vt. 1, 42 Atl. 607 (traders' association). See 17 HARV. L. REV. 558, 20 *id.* 355, 22 *id.* 234.